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Apparatus for conveying fish hooks, especially loose fish hooks, to a baiting machine.

The present invention relates to an apparatus for conveying fish hooks, especially loose fish hooks, singly to a baiting machine, comprising a rail for the reception of fish hooks in a hanging condition on the top of the rail and equipped with an associated feeding device for conveying the fish hooks in series along the rail towards a hook-handling arrangement for handling the fish hooks singly and one after the other relative to the rail and a chute for delivering fish hooks to a baiting machine.

The apparatus according to the invention is more especially designed for use in connection with the baiting of fish hooks for fishing lines, where the fish hooks are introduced one by one at a time into a baiting machine in connection with a baiting operation. The apparatus is particularly, but not exclusively, intended for use in connection with the handling of separate, that is to say loose fish hooks, the fish hooks in connection with the baiting operation or immediately after the baiting operation, being connected individually to an associated supply on a fishing line by means of connecting means known per se.

The apparatus shall thus be able to handle separate, that is to say loose fish hooks, which at the starting

point are not connected with the supply. The movement of the fish hooks can thereby not be controlled by the movement of an associated supply, as previously conventional in connection with the baiting operation, for example as is shown in U.S. Patent 4,631,850, but must be controlled mainly by the apparatus itself. By this it is important that each single fish hook assumes precisely the position intended.

With the present invention the aim is to produce a relatively simple apparatus, which can convey fish hooks individually by way of simple means to a baiting machine, so that the fish hooks can be delivered directly to the baiting machine in an accurate manner in a specific position.

The apparatus according to the invention is characterised in that the hook-handling arrangement comprises a slide member, which is displaceable in a path across the rail at its said one end, that the slide member is provided with a cavity opening towards the rail for the reception of a hook portion of a fish hook, the opening of the cavity being adapted, in a first position of the slide member, where the opening extends flush with the hook portion of an adjacent fish hook on the rail, for automatic reception of an adjacent fish hook by means of the pushing force of the feeding arrangement, while the opening of the cavity, in a second position of the slide member, where the opening is uncovered outside the rail, is adapted for automatic release of the fish hook for delivery of same in the chute which follows the hook-handling arrangement, and the opening of the cavity being bounded endwise towards the rail in a region between the catch position and the delivery position of the slide member and a chute for delivery of handled fish hooks to a baiting machine.

In connection with the baiting in a baiting machine there can also be effected an associated quality sorting. In this connection the apparatus as indicated above is

well-suited and the quality sorting can be effected without appreciable complications in a controlled manner with the single fish hook in an accurately established position. The quality sorting can be effected immediately  
5 in front of the baiting machine.

According to the invention a positively controlled handling of the fish hooks is ensured by means of a slide member having an associated cavity which receives fish hooks one by one at a time, the feeding arrangement  
10 constantly forwardly feeding a series of fish hooks to the hook handling arrangement, while the transfer itself of the fish hooks from the feeding arrangement to the delivery location can occur in a simple, accurately controlled manner, so that the fish hooks in the delivery  
15 position can assume an accurate position in connection with the subsequent baiting operation.

Further features of the invention will be evident from the following description having regard to the accompanying drawings, in which:

20 Fig. 1 shows in perspective the apparatus according to the invention, including a sorting apparatus for fish hooks plus a subsequent baiting apparatus.

Fig. 2 shows a section of the apparatus of Fig. 1, including a part of a feed rail with associated feeding  
25 arrangement plus a hook-catching arrangement which is illustrated in an upper catch position.

Fig. 3 shows the same as in Fig. 2 with the hook-catching arrangement illustrated in a lower delivery position.

30 Fig. 4 and 5 show, in the form of sections of Fig. 2 and 3, cross-sections of rail, hook-catching arrangement plus adjacent fish hooks.

Fig. 6 shows a detail in the sorting apparatus according to Fig. 1, seen from above.

35 Fig. 7 shows a cross-section of the detail as illustrated in Fig. 6.

The apparatus 10, as shown in Fig. 1, comprises a

feeding arrangement 11, a hook-catching arrangement 12, and a guide chute 13 with associated intake 13a to a baiting machine.

The feeding arrangement 11 comprises an elongate, horizontally extending rail 14 with associated feed bar 15 having screw thread 16 (see Fig. 2 and 3). The feed bar 15 is rotatably mounted in bearings 17a, 17b at opposite ends of the rail 14 and screw thread 16 of the feed bar 15 is uncovered in the region between the bearings 17a, 17b. The feed bar 15 is rotated by means of an electric motor 18, so that fish hooks 19, which are suspended on the feeding arrangement 11 via the hook portion 19a (see Fig. 2 and 3), are automatically pushed forwards in a row from left to right of Fig. 1, along screw thread 16 of the feed bar 15 and along bearing 17b flush with that at the right end of the feeding arrangement 11 of Fig. 1.

At the right end of the feeding arrangement 11 (see Fig. 2-5) the rail 14, that is to say that portion of the latter which forms the bearing 17b, is terminated endwise tightly up to the hook-catching arrangement 12, which extends vertically across the rail 14, so that the fish hooks 19 are fed the whole time to a support abutment against the hook-catching arrangement 12.

The hook-catching arrangement 12 comprises a carrier plate 20 which on the one, rear side carries a cylinder 21 having a reciprocating piston rod arrangement 22, 23, 24. To the piston rod arrangement 22-24 a slide 25 having a slide member 26 projecting laterally outwards is fastened on the other, front side of the carrier plate 20. The slide member 26 is adapted to be moved vertically upwards and downwards in a path tightly up to the end face of the bearing 17b at the illustrated right end of the rail 14.

The slide member 26 is shown in its upper position in Fig. 2 and 4, while it is shown in its lower position in Fig. 3 and 5. The slide member 26 is provided at its lower end with a cavity 27 having a depth corresponding to the thickness of the hook portion 19a on a fish hook 19.

The cavity has a horizontally extending upper bounding face 27a and a vertically extending rear bounding face 27b plus a lower bounding face 27c extending obliquely outwards and downwards. In the upper position of the slide member 26 the opening 27d of the cavity 27 faces towards the right end of the rail 14 flush with an adjacent hook portion 19a of the fish hook 19, which is arranged on the right end of the rail 14. When the slide member 26 assumes the upper position a fish hook 19' is pressed automatically by the feeding arrangement 11 into the cavity 27 of the slide member 26, as is illustrated in Fig. 4.

More specifically the cavity 27 is designed so that there is only space for a single fish hook 19' at a time in the cavity and so that the fish hook is held stable in place in the cavity during movement of the slide member past the rail 14, but moreover so that the fish hook falls out of the cavity immediately the slide member has passed the rail 14.

Immediately the slide member 26 is pushed downwardly from the illustrated upper position (Fig. 2 and 4), front side 26a of the slide member 26 will bar the succeeding fish hook 19'' in the subsequent row of fish hooks, as is illustrated in Fig. 3 and 5.

In Fig. 3 the slide member 26 is shown in its lower position, in which the cavity 27 is uncovered for discharging the fish hook 19' into the subsequent chute 13. The discharging occurs due to the fish hook 19' sliding out of engagement with cavity 27 of the slide member along the obliquely extending guide surface 27c and landing in the obliquely extending chute 13 just below the slide member 26.

Thereafter the slide member 26 is led back from the lower delivery position to the upper catch position. The succeeding fish hook 19'' is received automatically in the cavity 27 of the slide member in order in a following cycle to discharge the fish hook 19'' into the chute 13 in

a corresponding manner as explained for the fish hook 19'.

As is evident from Fig. 1-3 each of the fish hooks 19 is arranged in a hanging condition with its fish hook shaft 19b supported on one and the same (rear) side of the rail 14. Over the major portion of the area of the rail 14 the fish hook shaft 19b hangs rather steeply downwards. At the right end according to Fig. 1-3 the rail 14 is provided with a guide edge 28 extending obliquely upwards, which permits automatic readjustment of the shaft portion 19b of the fish hooks 19 from a relatively steep to a more obliquely outswung path. This involves the fish hooks 19, even when they find themselves on the rail 14, being swung into place over a guide surface 29 (see Fig. 1) in a continuation of the subsequent chute 13. Immediately the fish hook 19' slides off from the slide member 26 it is landed in place in a V-shaped groove in the guide surface 29 in order thereafter to slide further into an equivalent V-shaped groove in the intake to the chute 13, with the shaft portion 19b supported along the bottom of the chute 13 and with the hook portion 19a resting against the one, left side (see Fig. 7) of the V-shaped groove in the chute 13.

As is evident from Fig. 1 the chute 13 is divided into four sections 30-33 which are normally mutually partitioned off by means of three flaps 34-36, which are controlled by their respective compressed air cylinders 37,38,39.

A first section 30 is bounded below by a first flap 34, which guarantees the fish hook 19 in place in an accurately intended position longitudinally on the chute 13 for inspection with quality sorting. In the first section 30 the fish hook 19 is inspected via for example four feelers or sensors 41,42,43,44, which sense their respective portion of the fish hook 19, that is to say a first 41 and a second 42 feeler, which sense hook portion 19a of the fish hook 19 and a third 43 and a fourth 44 feeler which sense shaft portion 19b of the fish hook 19.



If the fish hook 19 at the inspection undertaken shows itself to be defective, the fish hook is removed immediately from the section 30. In the illustrated embodiment there is shown in Fig. 7 a nozzle-forming bore 45, which discharges into the bottom of the chute 13. By means of compressed air, which is blown through the bore 45, the defective hook is blown sideways towards the left out of the chute 13.

On the other hand, adequate fish hooks pass further in the chute 13, one by one at a time, from the section 30 via the sections 31, 32 and 33 one after the other and are fed from the section 33 directly to the intake 13a to a conventional baiting machine in a position adapted for this purpose in readiness for baiting.

The section 30 forms a transition between the guide surface 29 and the chute 13 and is provided with a curved guide surface portion 30a for turning hook portion 19a of the fish hook 19 from an obliquely positioned to a vertically positioned support position, immediately the fish hook is transferred from the section 30 to the section 31.

A second section 31 and a third section 32 which are bounded between their respective pairs of flaps 34, 35 and 35, 36 form buffers for sorted, accepted fish hooks, so that the baiting machine has available the whole time a supply of made ready, quality sorted fish hooks, whereby the baiting machine can operate at an optimal baiting speed, even on incorporating the quality control of the fish hooks just in front of the intake to the baiting machine.

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P A T E N T   C L A I M S

1. Apparatus (10) for conveying fish hooks, especially loose fish hooks, singly to a baiting machine, comprising a rail (14) for the reception of fish hooks (19) in hanging condition on the top of the rail (14) and equipped with an associated feeding arrangement (11) for conveying the fish hooks (19) in series along the rail (14) towards its one end, together with a hook-handling arrangement (12) for handling the fish hooks (19) singly and one after the other relative to the rail (14), and a chute (13) for delivering fish hooks to the baiting machine, characterised in that

the hook-handling arrangement (12) comprises a slide member (26), which is displaceable in a path across the rail (14) at its said one end (at 17b), that

the slide member (26) is provided with a cavity (27) opening towards the rail for the reception of a portion (19a) of a fish hook (19),

opening (27d) of the cavity (27) being adapted, in a first position of the slide member (26), where the opening (27d) extends flush with an adjacent fish hook (19) on the rail (14), for automatic reception of an adjacent fish hook (19) by means of the pushing force of the feeding arrangement (11),

while opening (27d) of the cavity (27) is adapted, in a second position of the slide member (26), where the opening (27d) is uncovered outside the rail (14), for automatic release of the fish hook (19) for delivery of same into the chute (13) which follows the hook-handling arrangement (12),

and opening (27d) of the cavity (27) being bounded endwise towards the rail (14) in a region between the catch position (Fig. 2 and 4) and the delivery position (Fig. 3 and 5) of the slide member (26).

2. Apparatus in accordance with claim 1,

characterised in that

the slide member (26) consists of a bar-shaped member, which is vertically moveable forwards and backwards relative to the rail (14),

5 the slide member (26) being moveable from an upper position, in which the cavity (27) is flush with a portion of an adjacent fish hook on the rail (14) for reception of said fish hook portion in the cavity, to a lower position for delivery of the fish hook into the subsequent chute  
10 (13),

while below the cavity (27) is provided with a guide surface (27c) extending obliquely downwards and outwards for easy discharge of the fish hook from the slide member (26) to the chute (13).

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3. Apparatus in accordance with claim 1 or 2,  
characterised in that

the rail (14), which over the major portion of its longitudinal dimension has a side surface having a  
20 relatively large height for the support of shaft portion (19b) of the fish hooks (19) in a relatively steep downwardly extending position, has in a region (at 28) just in front of the slide member a relatively low height and is preferably designed with a guide surface (28)  
25 extending obliquely upwards, in order to permit shaft portion (19b) of the fish hook (19) to assume just in front of the slide member (26) a somewhat turned about position extending obliquely outwards and downwards, and that

30 by means of an extended guide surface (29) just below the slide member (26) the chute (13) has a path directed obliquely outwards and downwards substantially equivalent to the shaft portion (19b) of the fish hook (19) for the reception of the fish hook in its delivery  
35 position.

4. Apparatus in accordance with one of the claims 1-

3, characterised in that

the chute (13) is divided into a number of axially succeeding sections (30-33),

5 a first section (30) including a number of sensors (41-44) for quality inspection of a fish hook (19) which is received in the section (30) together with a device (45) for the removal of a fish hook (19) from the chute which is found to be defective,

10 while following sections (31,32) can serve as a buffer zone for receiving their respective fish hook,

and a last section (33) forms an intake to a baiting machine.

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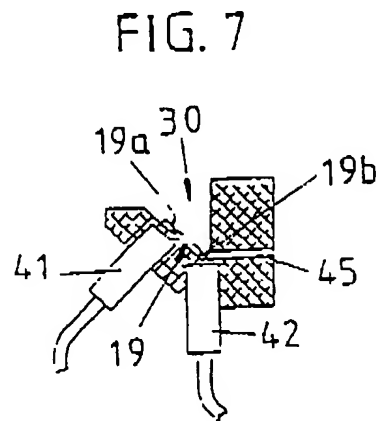
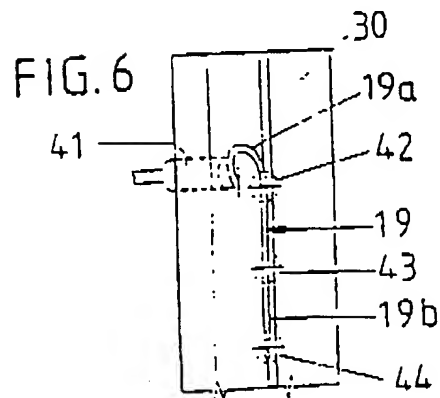
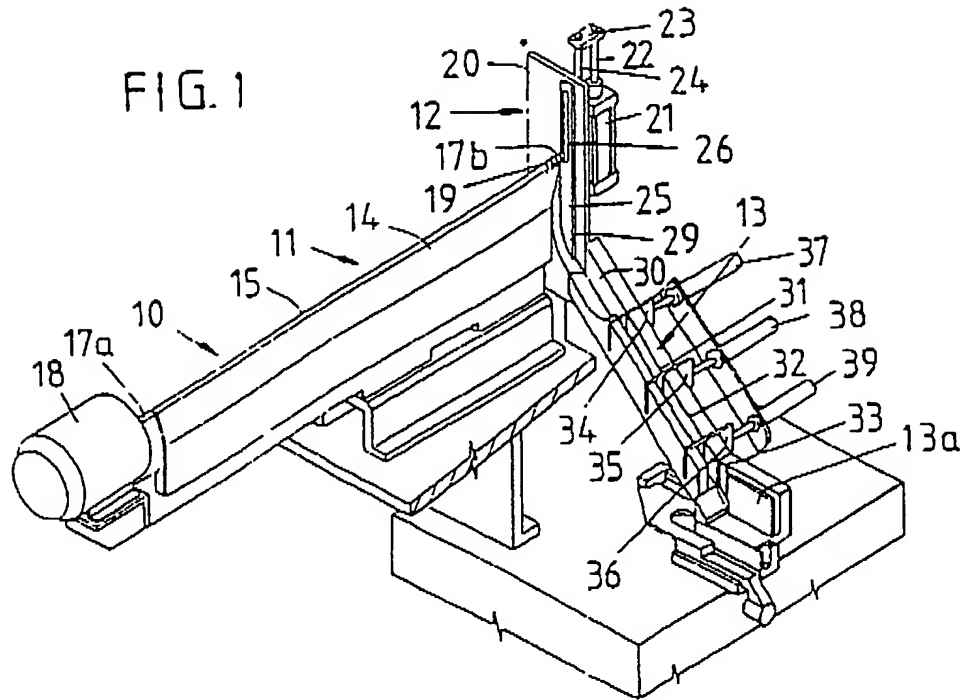
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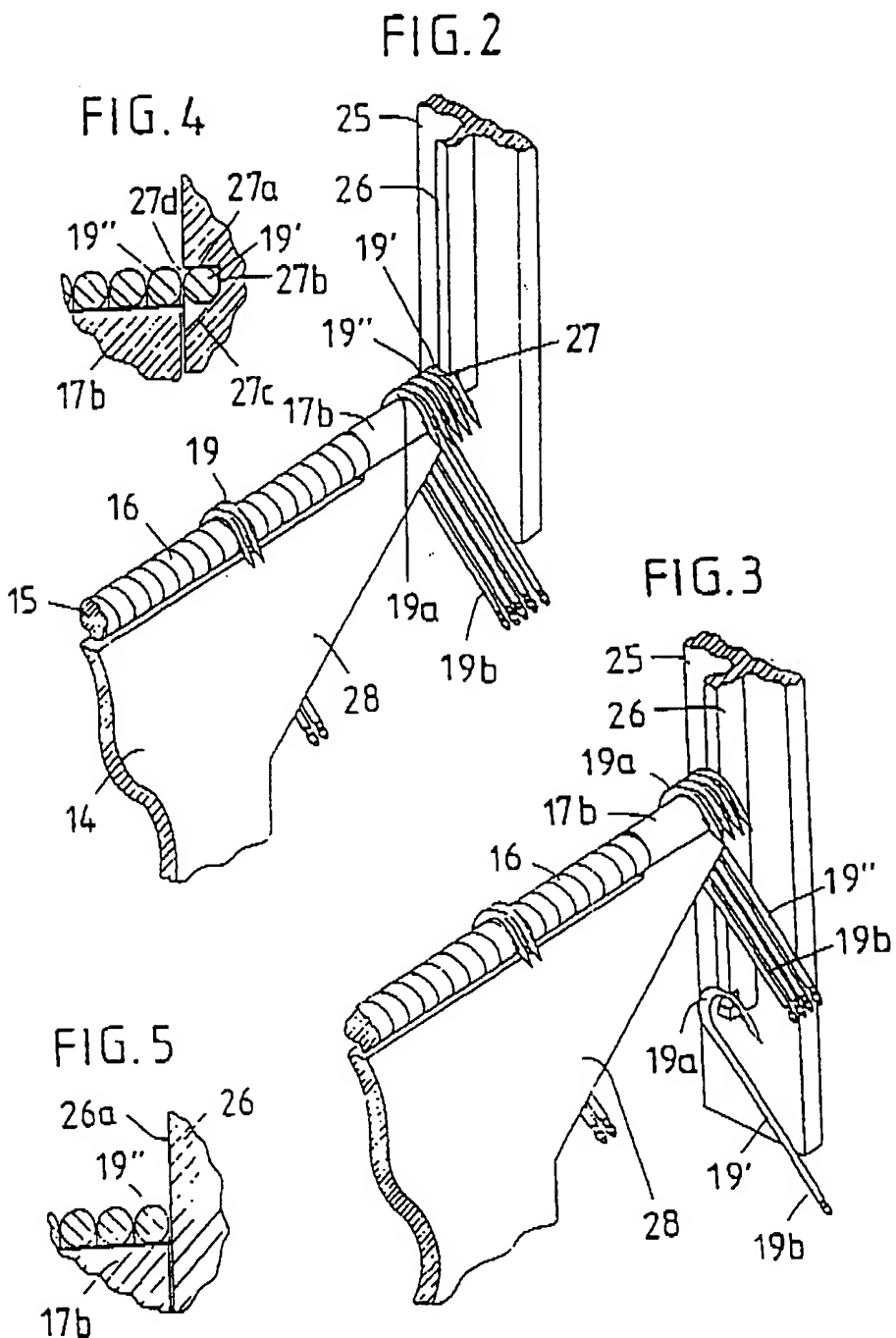
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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/NO 94/00055

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A01K 91/18

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

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IPC 6: A01K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 4477992 (CURTIS E. LANG ET AL), 23 October 1984 (23.10.84) --	1-4
A	US, A, 4631850 (BERNARD CHUREAU), 30 December 1986 (30.12.86) --	1-4
E	NO, A, 923668 (KOLBJØRN BJØRSHOL), 24 March 1994 (24.03.94) -----	1-4

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4477992	23/10/84	CA-A- 1153551 EP-A- 0063035 JP-A- 57181628 JP-B- 59015602	13/09/83 20/10/82 09/11/82 10/04/84
US-A- 4631850	30/12/86	EP-A- 0192901 FR-A,B- 2551319	03/09/86 08/03/85
NO-A- 923668	24/03/94	NONE	

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